

# Early Adversity and the Health of the Public

M. Denise Dowd, MD,MPH

*9<sup>th</sup> Annual Governor's Public Health Conference, May 1, 2014*



**There can be no keener revelation of a society's soul than the way in which it treats its children**

*Nelson Mandela*



# Objectives

- Describe how early childhood adversity influences individual and public health
- Understand poverty as the single most important public health problem facing our communities.
- Propose possible changes in current health care systems which would prevent, reduce or mitigate the adverse effects of toxic stress on the developing brain.



# How I got started: early research

## **Pediatric Firearm Injuries, Kansas City, 1992: A Population-Based Study**

M. Denise Dowd, MD, FAAP\*; Jane F. Knapp, MD, FAAP‡; and Laura S. Fitzmaurice, MD, FAAP‡

# Who were these kids with GSW's?

The baby evaluated for bruises and called CPS, became the...

The toddler who missed well child care appointments, became the...

The 7 year old with chronic stomach aches who won't go to school, became the...

The 9 year old with ADHD and oppositional defiant disorder, became the....

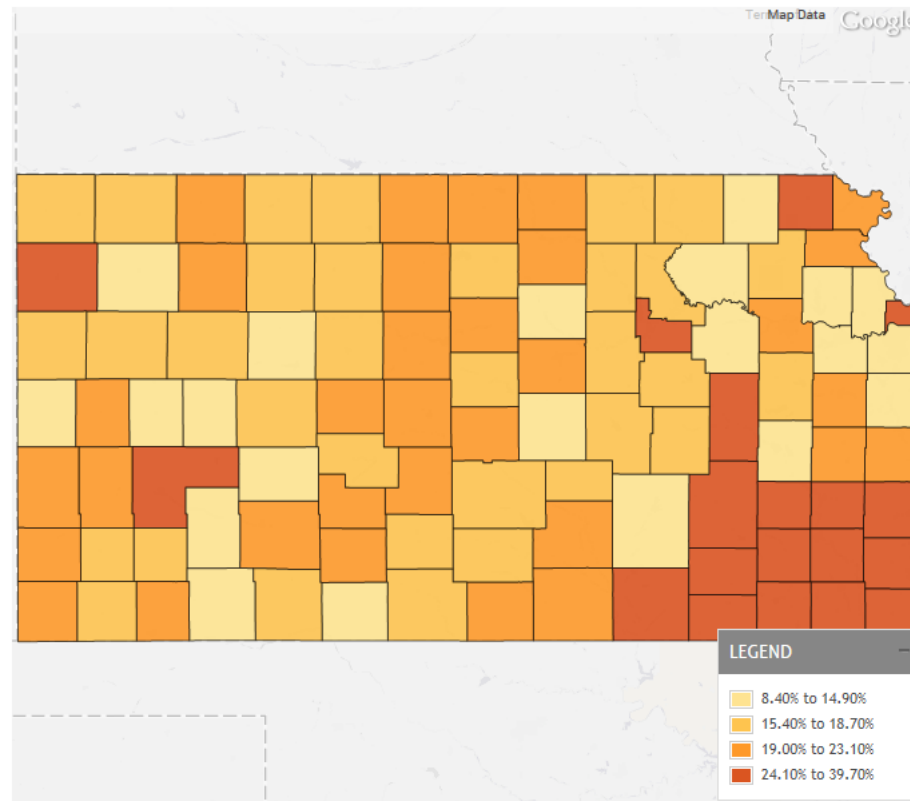
The 12 year old with a boxers' fracture, became the..

The 16 year old shot in a drive by, became the..

**The homicide story on the back page.**



# Kansas children under 18 years of age who live in families with incomes below 100% of the U.S. poverty threshold



## POVERTY (PERCENT) - 2011

Kansas Action for Children  
KIDS COUNT Data Center, [datacenter.kidscount.org](http://datacenter.kidscount.org)  
A project of the Annie E. Casey Foundation

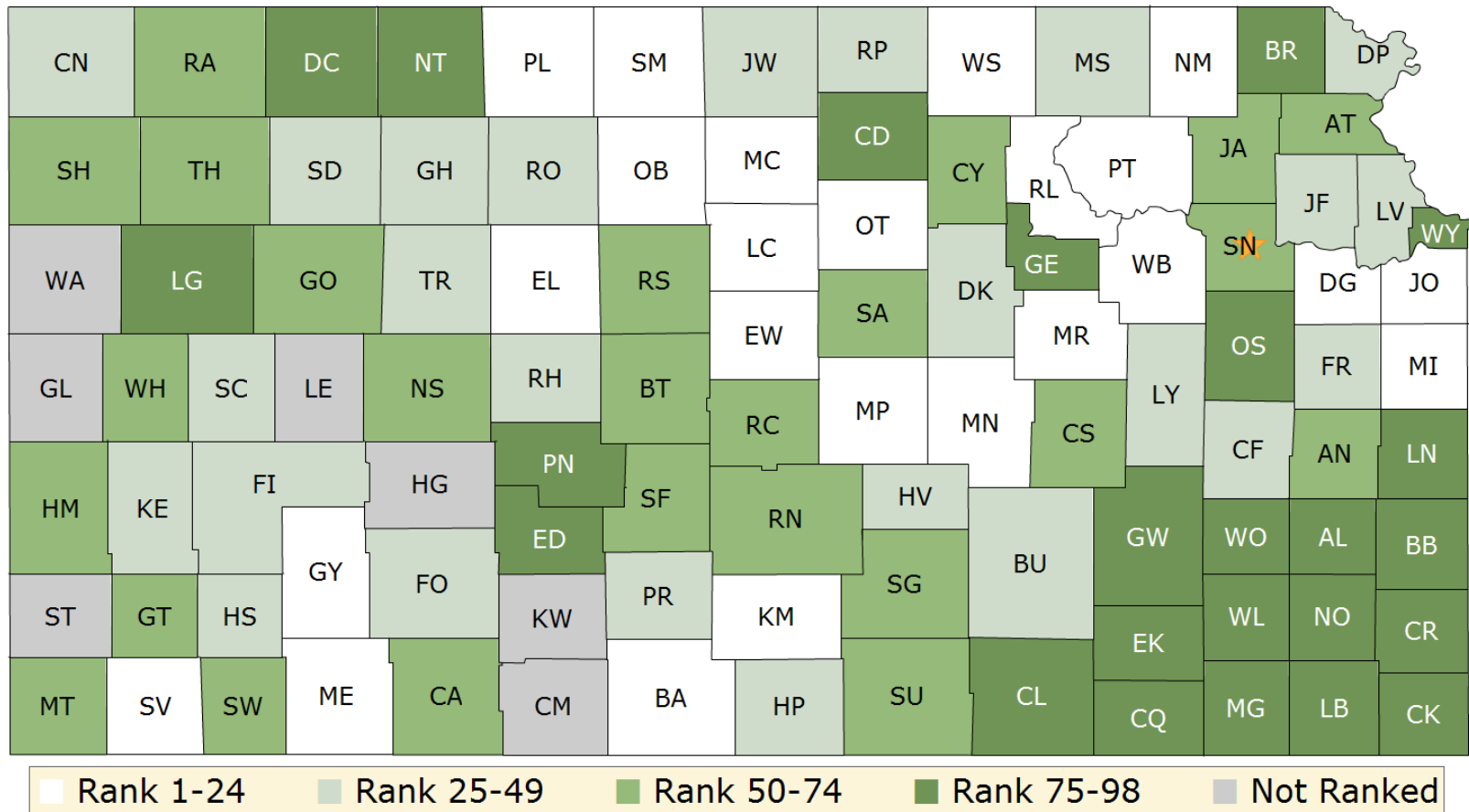
# Poverty: Definition

*The extent to which an individual does without resources.*

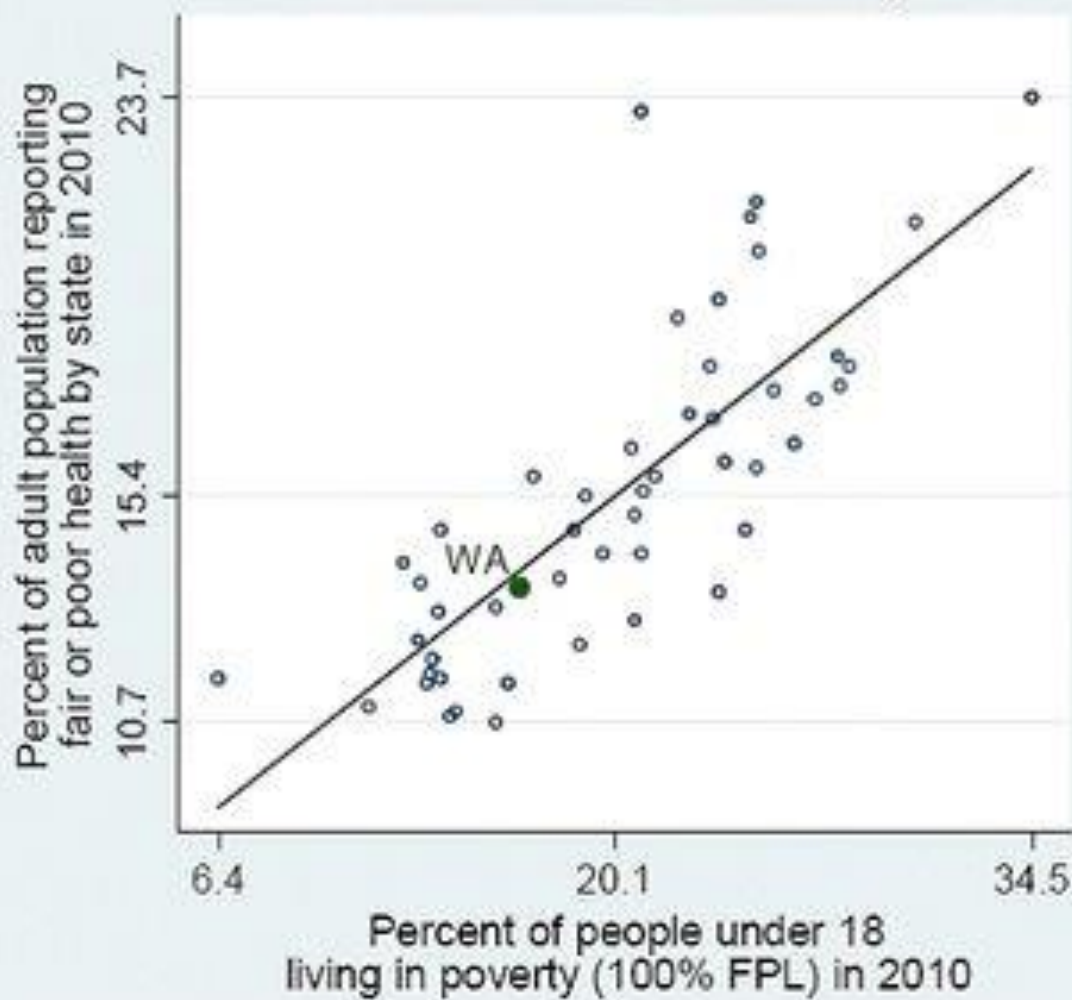
- ✓ Financial
- ✓ Emotional
- ✓ Cognitive
- ✓ Physical
- ✓ Social Support
  - ✓ Role models
  - ✓ Safety



## 2014 Health Outcomes - Kansas

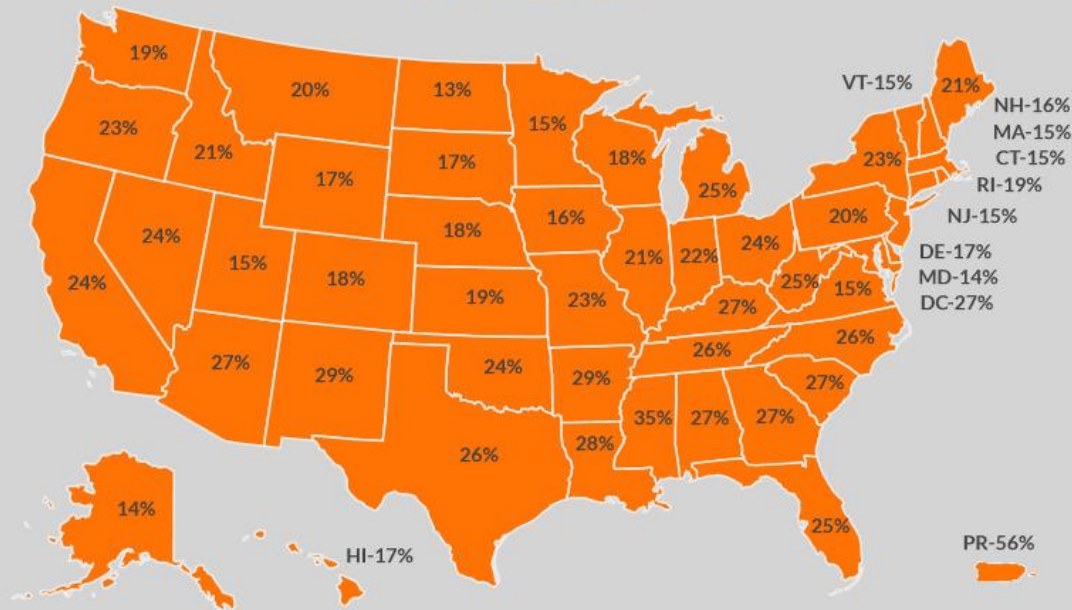


Health Status v. Child Poverty



# CHILD POVERTY

How many children live in poverty in my state?



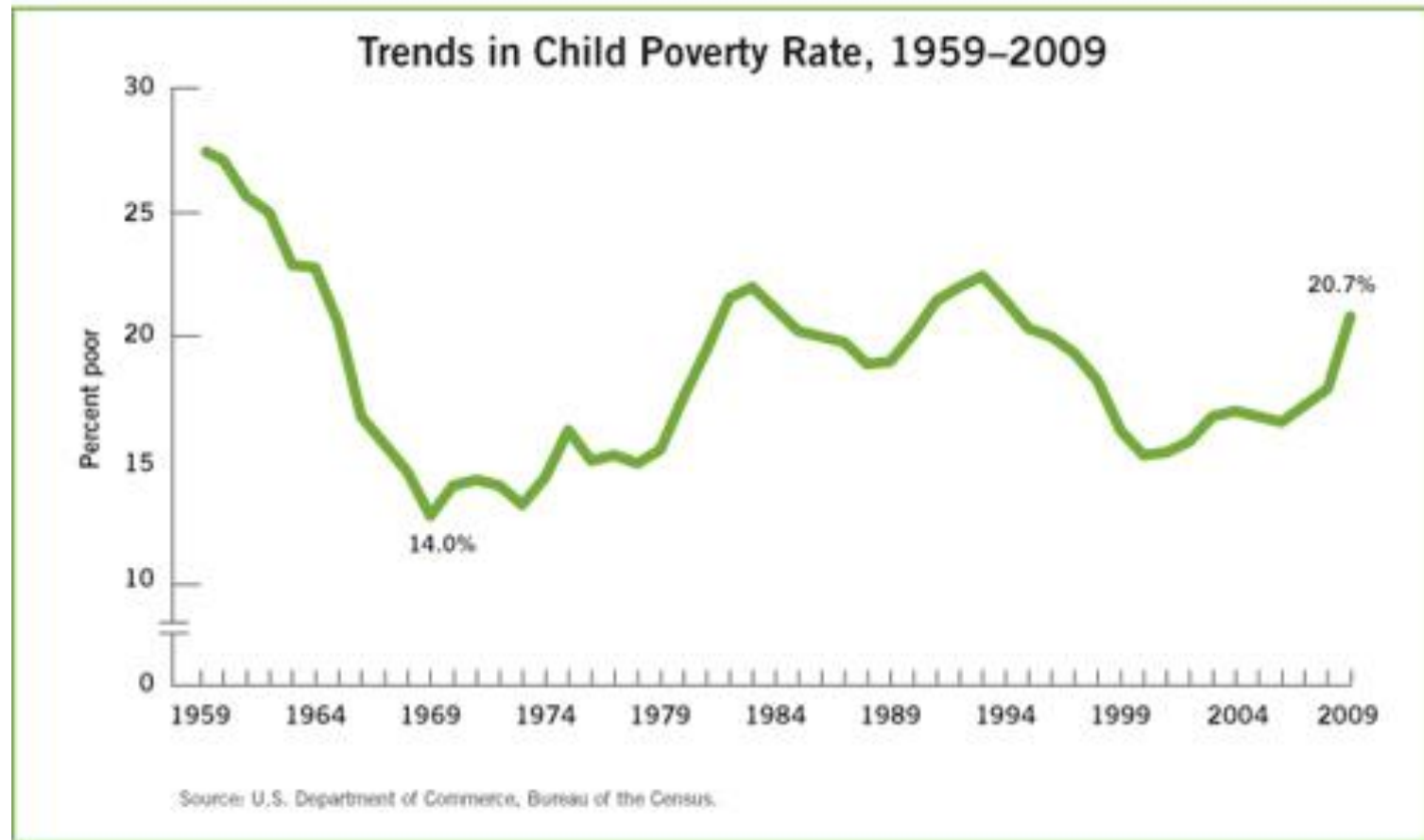
More than  
**16 million**

children younger  
than 18 live  
in poverty  
in the US

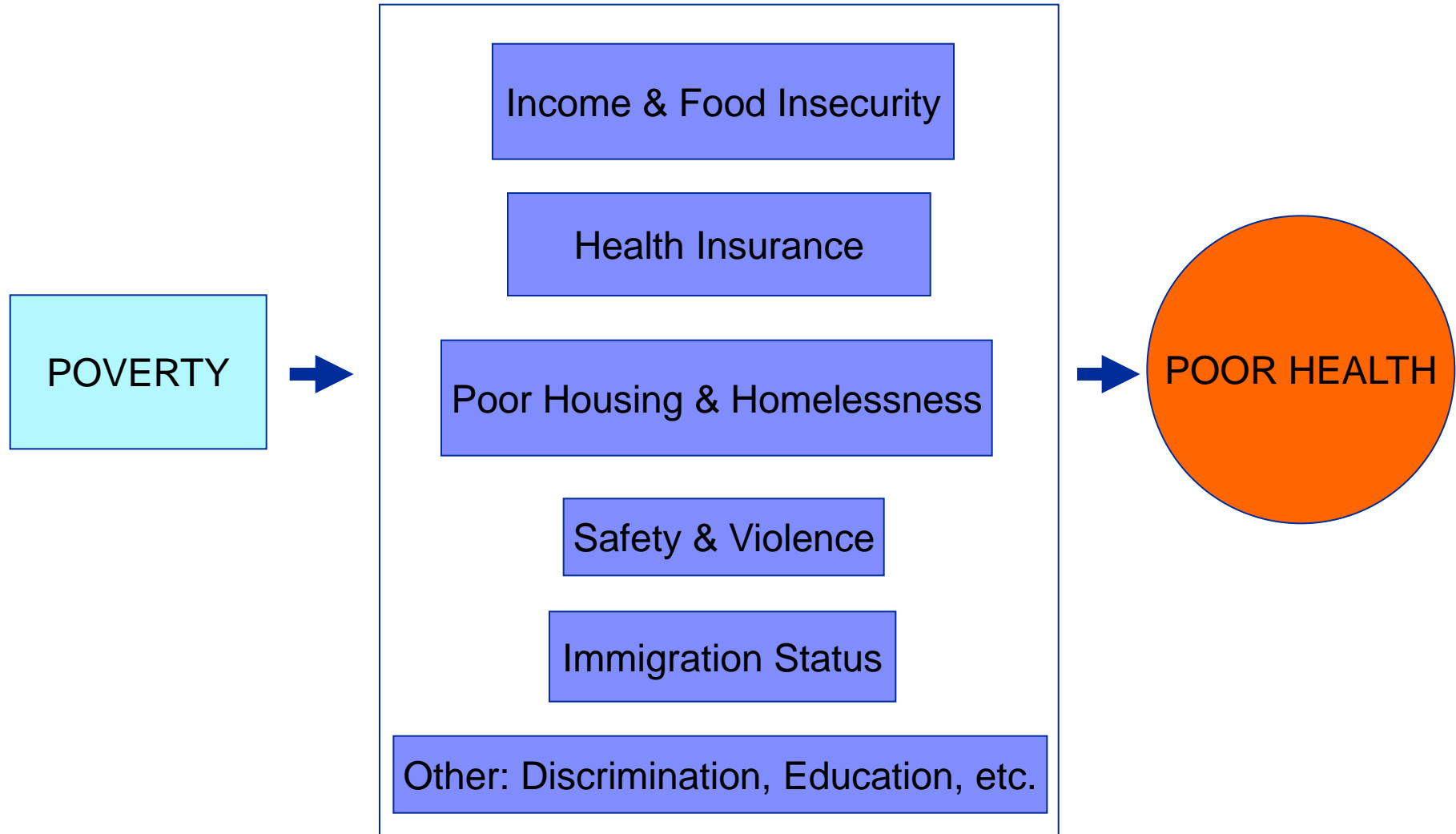


26% of  
these  
children  
are  
younger  
than 5

Child poverty was at its lowest level 40 years ago (14.0%). After dropping 27 percent between 1992 and 2000, the children poverty rate increased by 28 percent between 2000 and 2009.



# How Does Income Effect Health?



**This is not just about child health.  
This is about health across the lifespan.**

# The Adverse Child Experiences (ACE) Study



- Vincent J. Felitti, MD and Robert J. Anda, MD, MS
- Asked 26,000 adults at Kaiser, San Diego's Dept of Preventive Medicine.
- 17,421 participated in the study.
- Participants completed a questionnaire.



# Adverse Childhood Experiences (ACE) Studies

- Measured association between current health status and behaviors and “ACE”
- Exposure to:
  - Childhood abuse and neglect
  - Family dysfunction

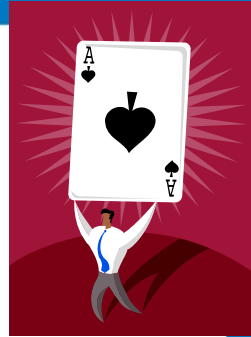
*\*Felliti V, Anda R, Nordenberg D, et al. Am J Prev Med 1998;14(4):245-258*



# ACE CRITERIA

1. Recurrent physical abuse
2. Recurrent emotional abuse
3. Contact sexual abuse
4. An alcohol or drug abuser in the household
5. An incarcerated household member
6. Someone who was chronically depressed, institutionalized, or suicidal in home
7. Mother treated violently
8. One or no parents, or parents divorced.
9. Emotional or physical neglect

# ACE Scores



Number of categories of adverse childhood experiences are summed ...

| <u><i>ACE score</i></u> | <u><i>Prevalence</i></u> |
|-------------------------|--------------------------|
| <b>0</b>                | <b>36%</b>               |
| <b>1</b>                | <b>26%</b>               |
| <b>2</b>                | <b>16%</b>               |
| <b>3</b>                | <b>9.5%</b>              |
| <b>4 or more</b>        | <b>12.5%</b>             |

- *More than half (almost 2/3)* had at least one ACE
- *1 in 8* have 4 or more ACEs
- Average pediatrician will see 2-4 children with an ACE score of 4 or more each day

Adapted from Anda RF et al., 2006. Eur Arch Psychiatry Clin Neurosci 256: 174-186.

# **Compared to a person with an ACE of 0, those with an ACE of $\geq 4$ has increased health risks**

|                      |        |
|----------------------|--------|
| Hepatitis            | 240%   |
| Chronic lung disease | 260%   |
| Obesity              | 200%   |
| Depression           | 460%   |
| Suicidality          | 1,220% |

# **Childhood Adversity has Lifelong Consequences.**

**Significant adversity in childhood is strongly associated with unhealthy lifestyles and poor health decades later.**





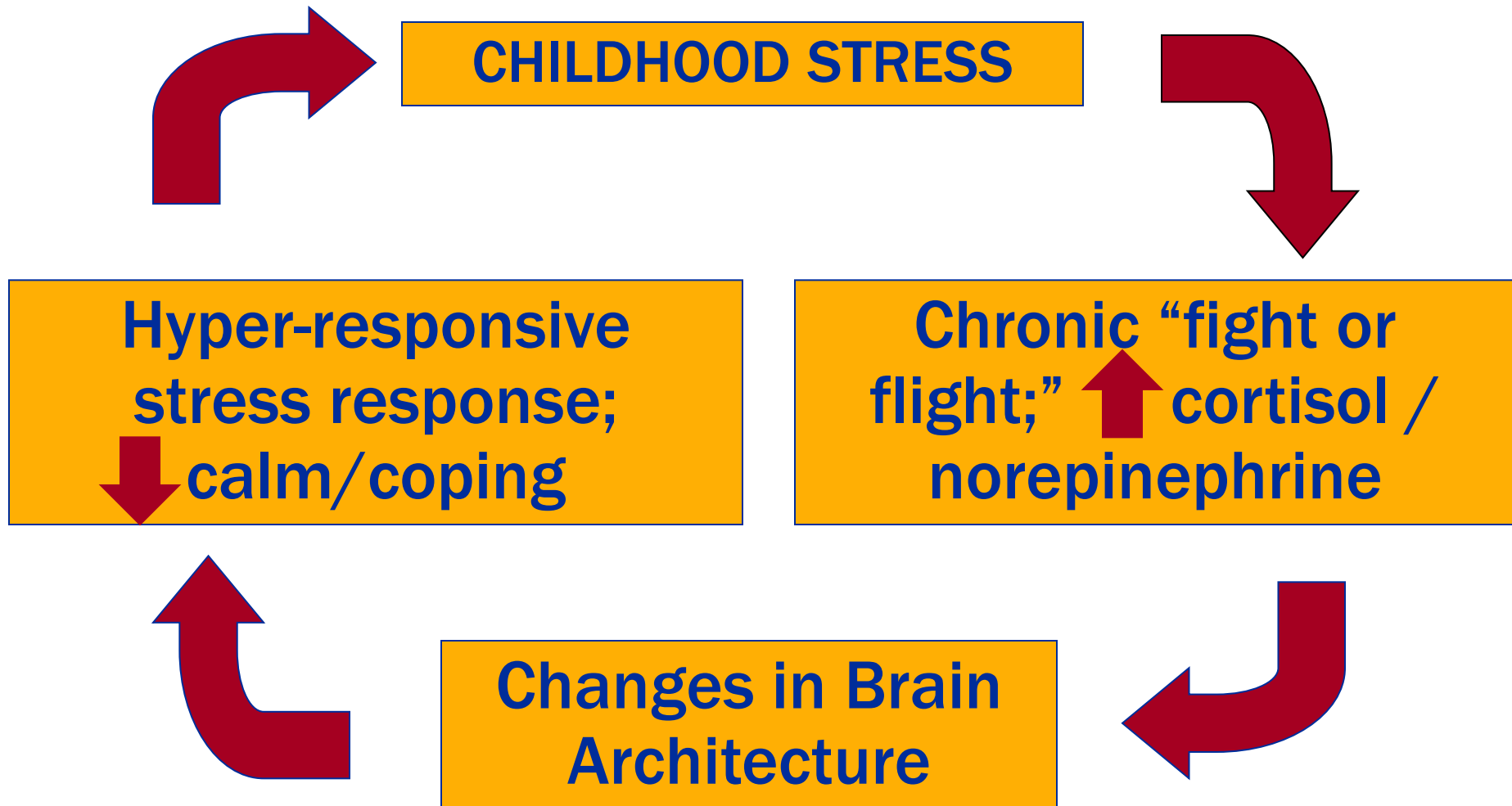
| Positive Stress  | Tolerable Stress  | Toxic Stress   |
|--|---|--|
| <ul style="list-style-type: none"> <li>• Normal and essential part of healthy development</li> <li>• Brief increases in heart rate and blood pressure</li> <li>• Mild elevations in hormonal levels</li> <li>• Example: tough test at school. Playoff game.</li> </ul> | <ul style="list-style-type: none"> <li>• Body's alert systems activated to a greater degree</li> <li>• Activation is time-limited and buffered by caring adult relationships</li> <li>• Brain and organs recover</li> <li>• Example: death of a loved one, divorce, natural disaster</li> </ul> | <ul style="list-style-type: none"> <li>• Occurs with strong, frequent or prolonged adversity.</li> <li>• Disrupts brain architecture and other organ systems.</li> <li>• Increased risk of stress-related disease and cognitive impairment.</li> <li>• Example: abuse, neglect, caregiver substance abuse</li> </ul> |

**Intense, prolong, repeated, unaddressed**

**Social-Emotional buffering, Parental Resilience,  
Early Detection, Effective Intervention**



# Impact of Early Stress



# Exposure to Toxic Stress

## *Multi-System Impacts*

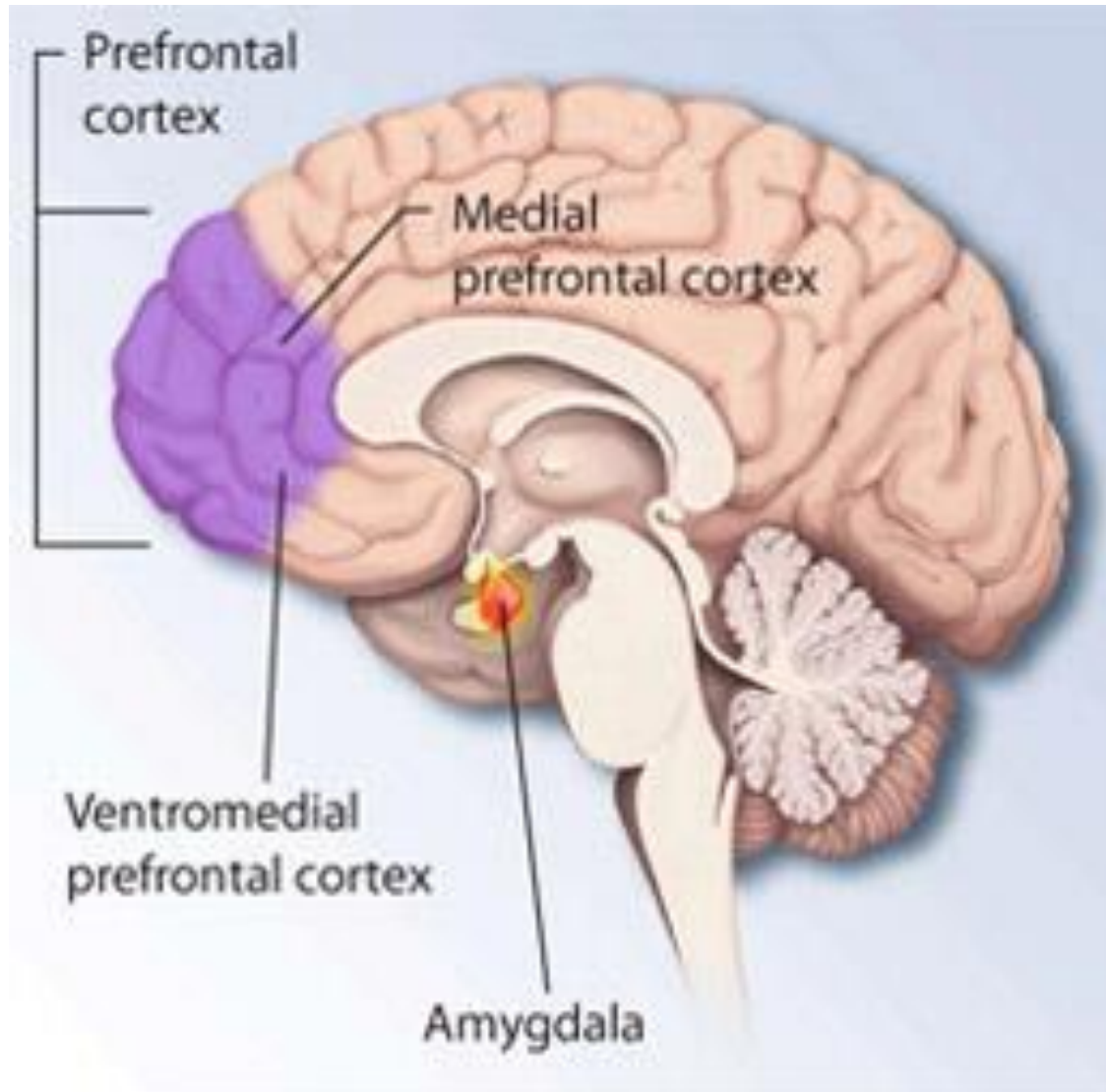
### Neurologic

- HPA Axis Dysregulation
- Reward center dysregulation
- Hippocampal neurotoxicity
- Neurotransmitter and receptor dysregulation

### Immunologic

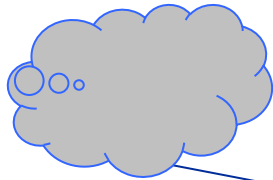
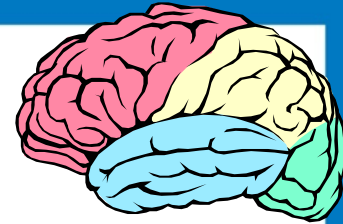
- Increased inflammatory mediators and markers of inflammation such as interleukins, TNF alpha, IFN- $\gamma$





## Brain Structures Involved in Dealing with Fear and Stress

# Out of Balance?



## Prefrontal Cortex

**Cold Cognition**

**Judgmental**

**Reflective**

**Calculating**

**Think about it**

## Amygdala

**Hot Cognition**

**Emotional**

**Reactive**

**Impulsive**

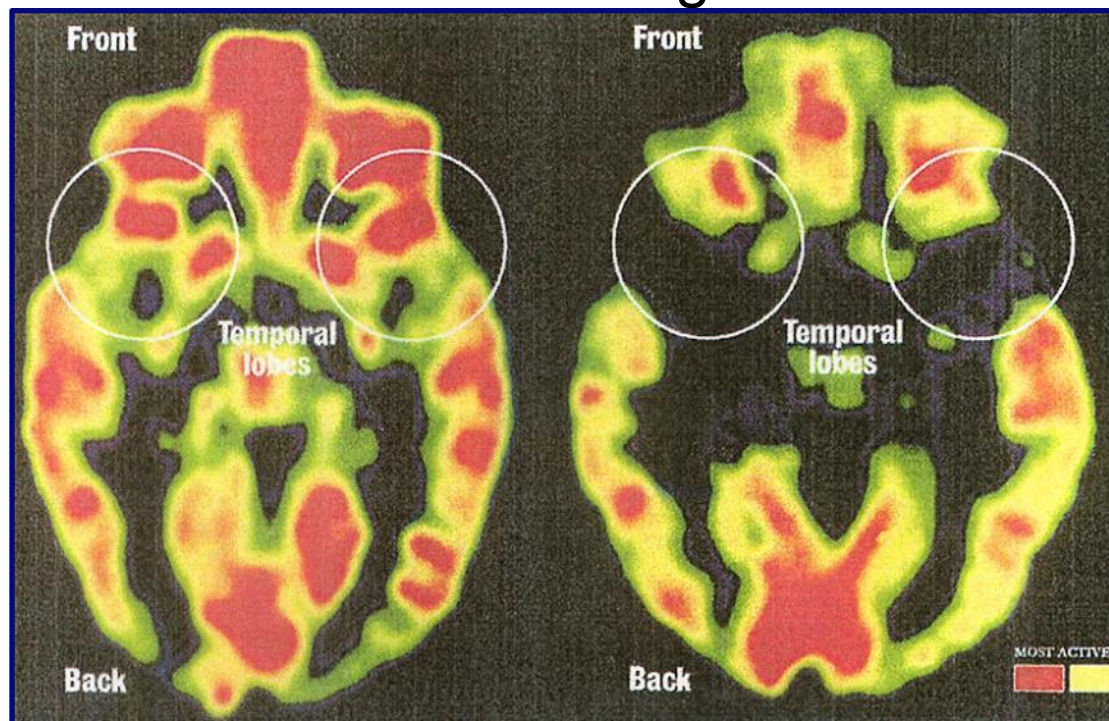
**Just do it**

**Biological maturity by 24**

**Biological maturity by 18**

# Toxic Stress Can Affect Brain Development

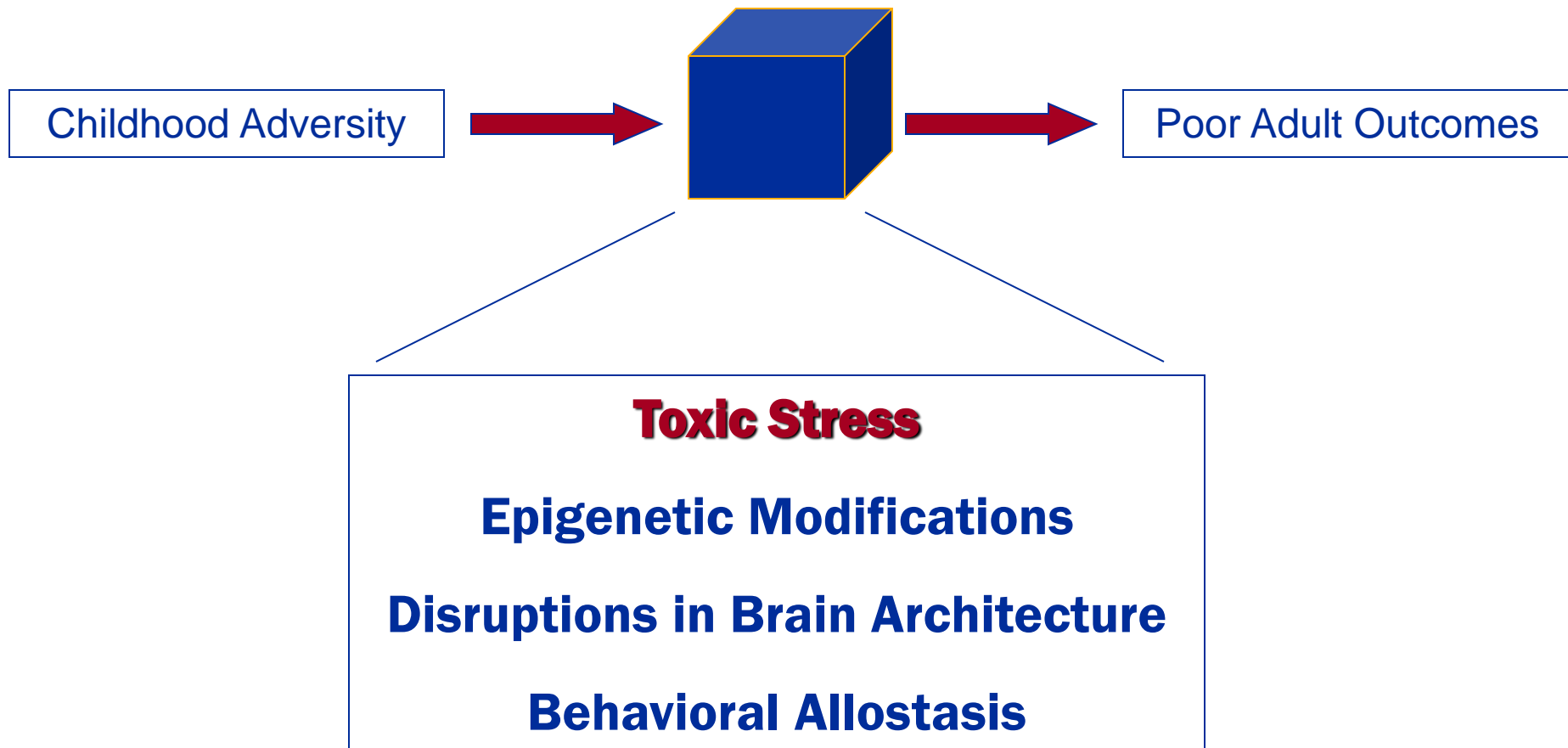
- Organizational changes
- Brain chemistry imbalances
- Structural changes



Healthy Child

Severe Emotional Neglect

# Linking Childhood Experiences and Adult Outcomes

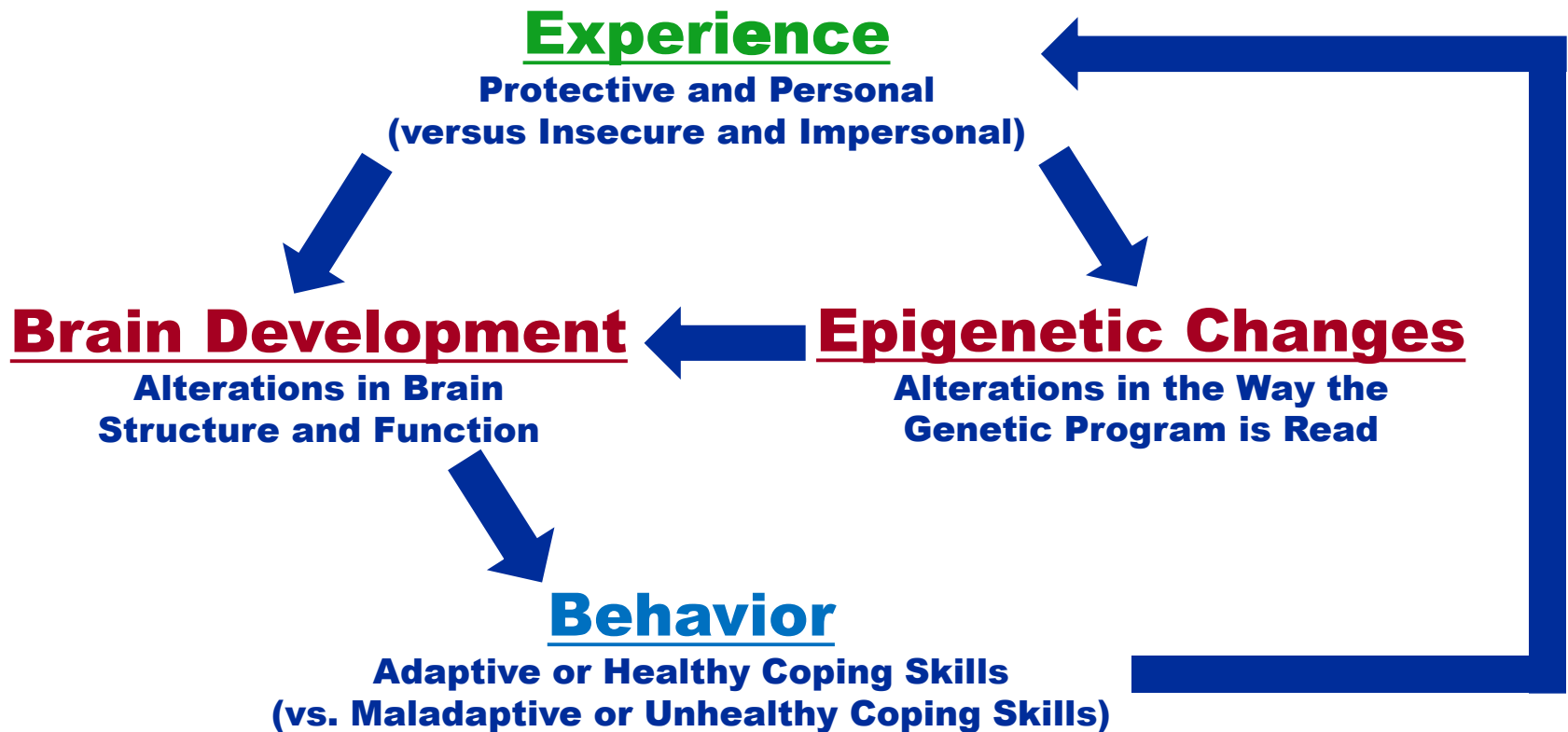


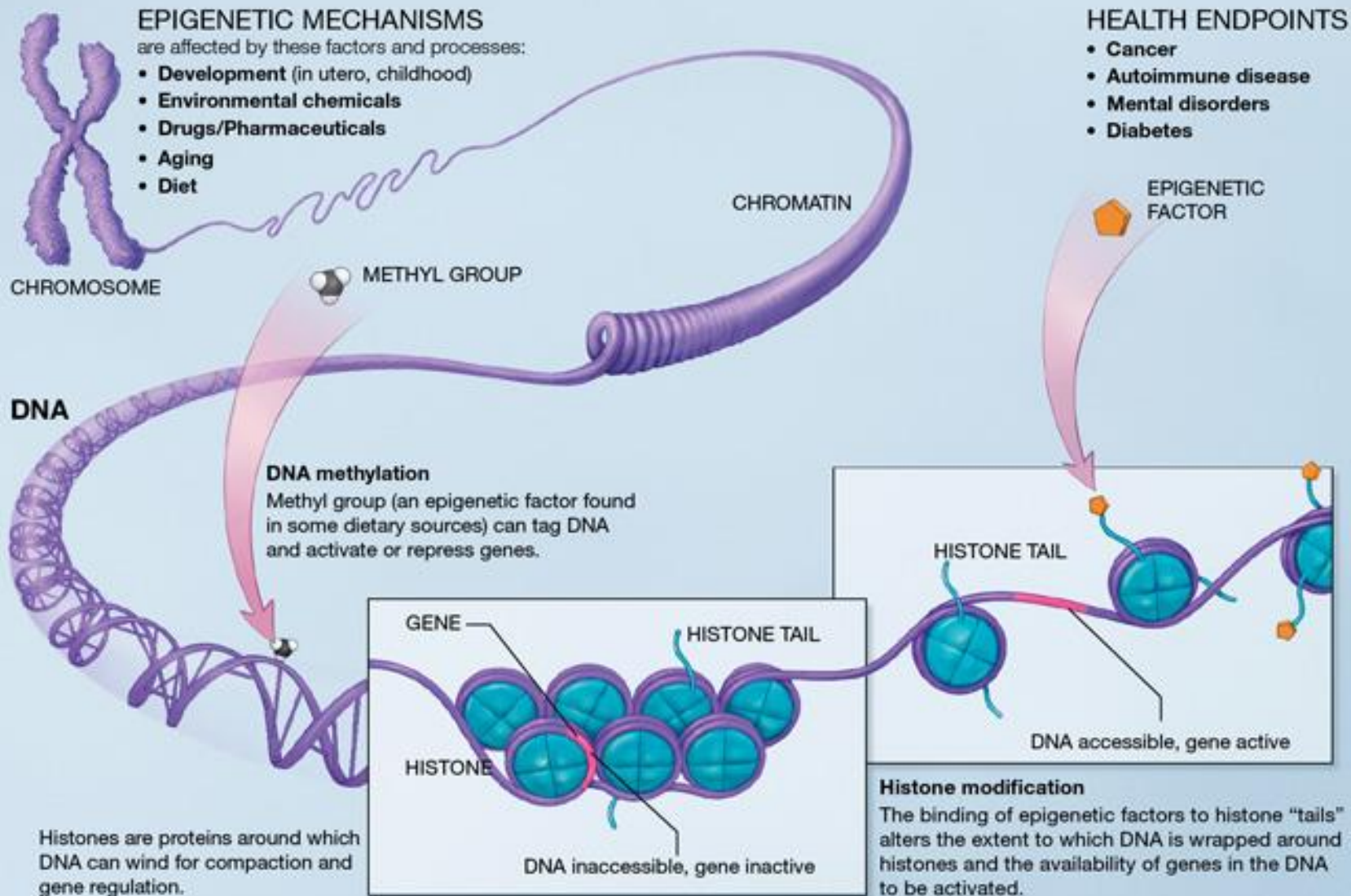
# Behavioral Allostasis

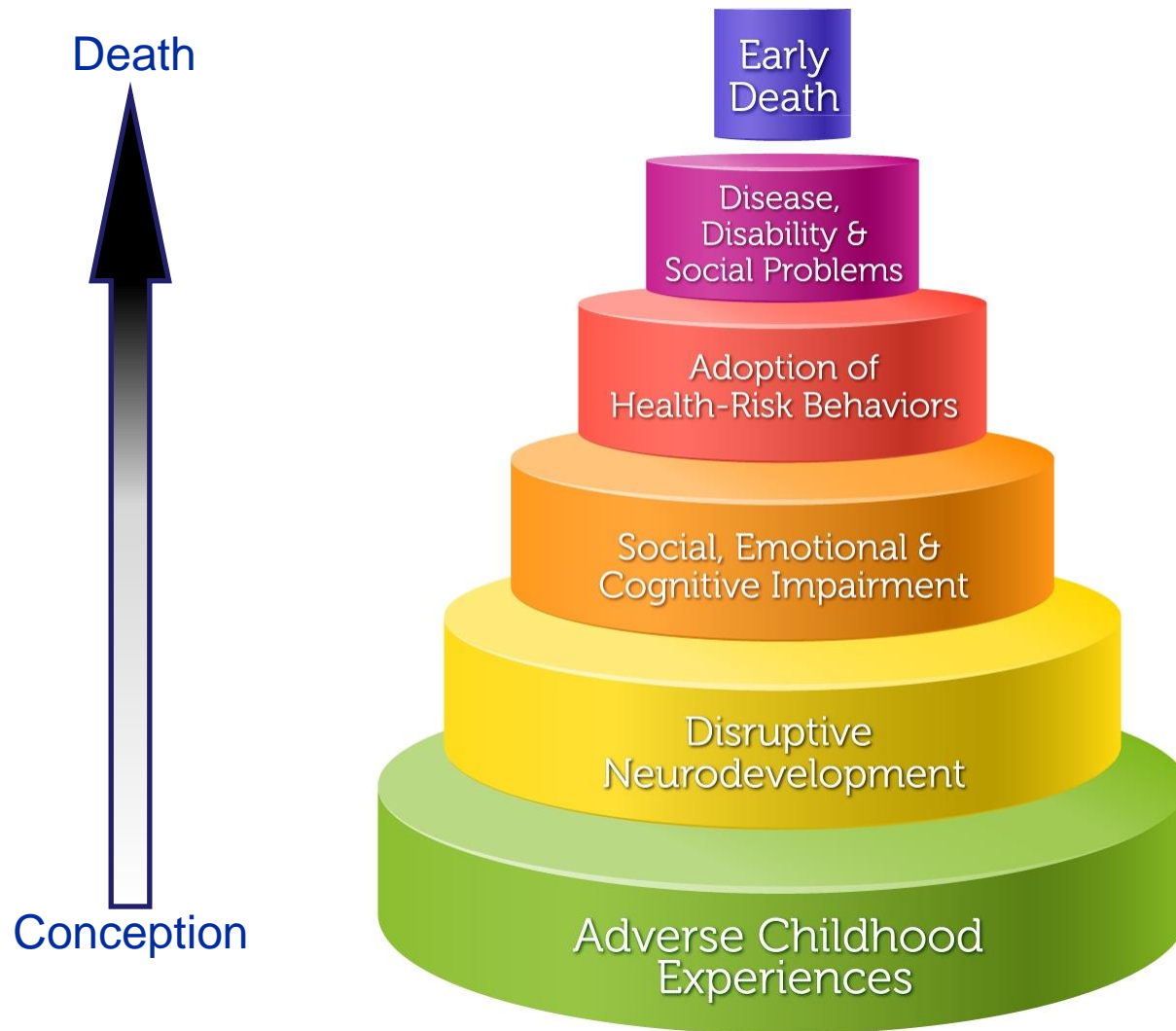
- The process of achieving stability, or homeostasis, through physiological or behavioral change
- Short term adaptation, response to challenges
- It is physiological (ANS, HPA axis)
- Allostatic “load” may become harmful



# Development results from an on-going, re-iterative, and cumulative dance between nurture and nature

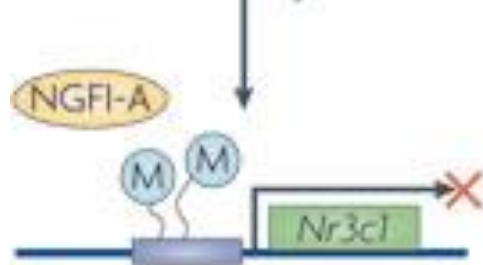






## **Mechanisms By Which Adverse Childhood Experiences Influence Adult Health Status**

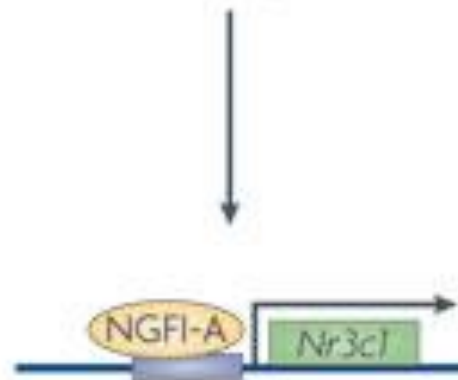
**a** Low licking and grooming



↓ GR expression

High corticosterone levels  
High anxiety  
Low licking or grooming.

**b** High licking and grooming

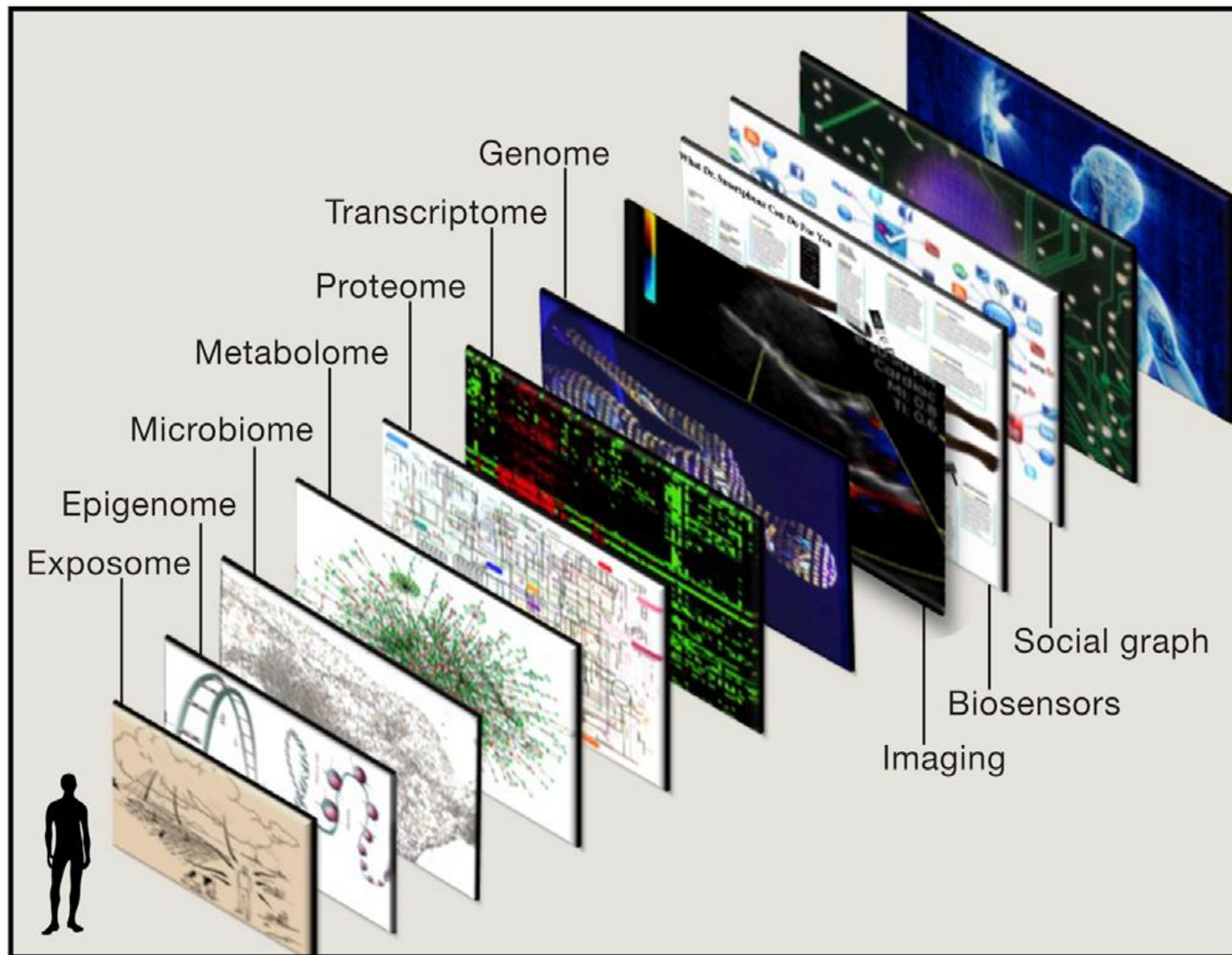


↑ GR expression

Low corticosterone levels  
Low anxiety  
High licking or grooming.



# Geographic Information System of a Human Being





## Core Concepts of Child Development

Brains are built over time, neural circuits are wired in a bottom-up sequence, and the capacity for change decreases with age.

The interaction of genes, environment, and personal experience shapes the architecture of the developing brain, and the active agent is the “**serve and return**” nature of children’s relationships with the important adults in their lives.

# What about resilience?



# Building Resilience

- “Ordinary Magic”
- Allows children to emerge from stressful experiences with unique strengths
- Allows healthy development in spite of adversity
- Adverse experiences are history, not destiny



Mastin, A. (2001) Ordinary Magic: Resilience Processes in Development.  
American Psychologist, 56 (3), 227-238

# Addressing Toxic Stress

## Treatment of the consequences

- Examples: Trauma Focused Cognitive Behavior Therapy and Parent Child Interactive Therapy
- Reactive – some “damage” already done!
- Very COSTLY
- Efficacy linked to age and chronicity
- Insufficient number of / access to providers
- Limited reimbursements; carve-outs
- Persistent STIGMA

“Character Flaws” vs “Biological Maladaptations”

# Addressing Toxic Stress

- **Secondary / Targeted Preventions**
  - Focused, targeted interventions for those deemed to be “**at high risk**”
  - Visiting Nurse Programs (Nurse Family Partner.)
  - Parenting Programs (Triple-P, Nurturing Parent.)
  - More likely to be effective; minimize “damage”
  - Requires **screening**
  - Still issues with **stigma**, **numbers** of/**access** to providers

# Addressing Toxic Stress

- **Primary / Universal Prevention**

- Proactive, universal interventions to make stress positive, or tolerable instead of toxic
- Acknowledges that preventing all childhood adversity is impossible and even undesirable
- Parent's Toxic Stress must be addressed
- **Actively building resiliency** (“immunizing” through positive parenting, 7C's, promoting optimism, formalized social-emotional learning)
- **SE Buffers** allow the physiologic stress response to return to baseline
  - **Parenting/Caregiving** skills for younger children
  - **SEL** skills for older children ([www.casel.org](http://www.casel.org))

Take home point:

# Parent /caregiver support is Critical

- Address physiologic and safety needs
- Promote healthy relationships and attachment
- Encourage **foundational coping skills** as they emerge

WE CAN:

- Promote this sort of “Purposeful” Parenting
- Advocate / participate **public health approach** to address TS



# Public Health Implications

What we **KNOW**:

- That **70% of early deaths are preventable**, with...
- The **majority (40% overall)** due to **behavioral patterns** that lead to **chronic disease**.
- **Behavioral Allostasis** due to toxic stress

**McGinnis, Williams-Russo and Knickman, 2002**

# **A Public Health Dilemma**

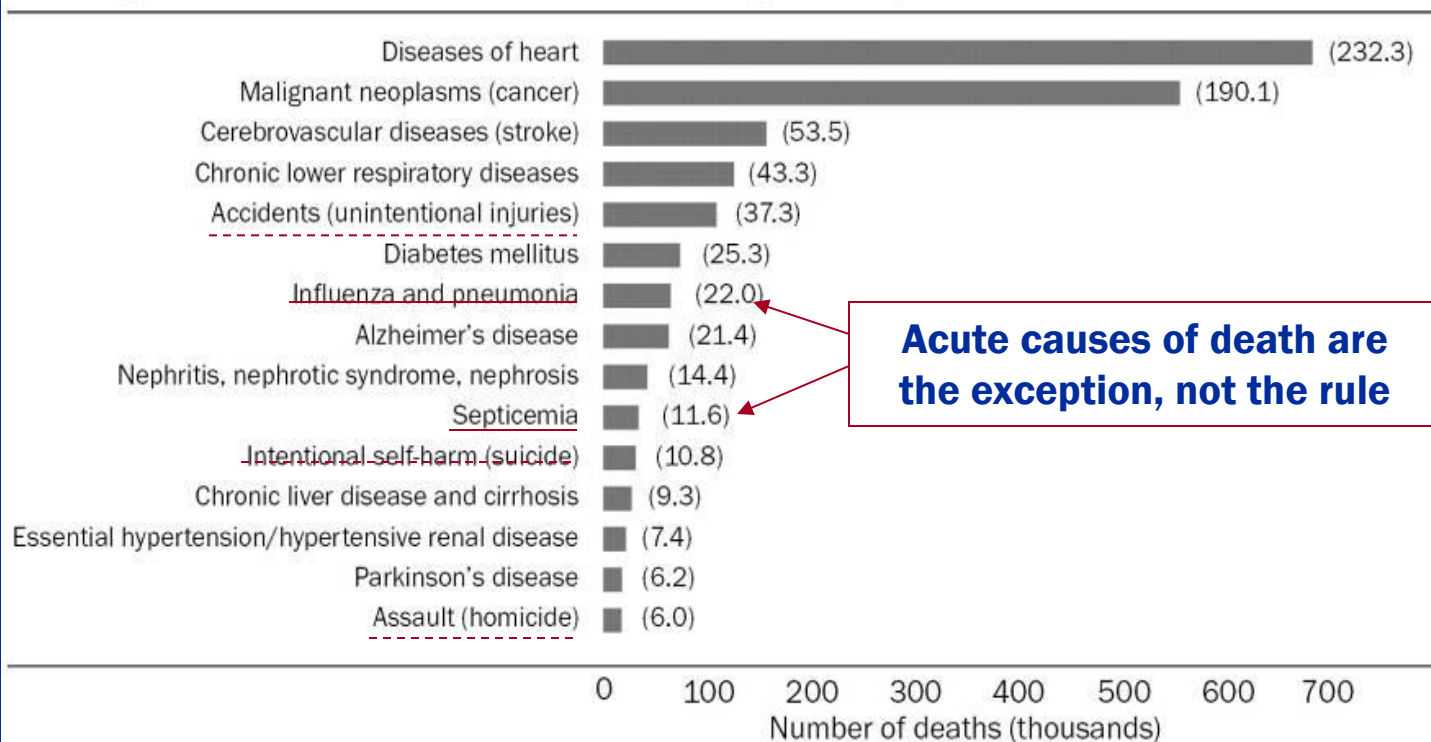
**Do we continue to treat disease,  
the unhealthy lifestyles that lead to  
disease,**

**or the TOXIC STRESS that leads to the  
adoption of unhealthy lifestyles??**

# Proximal Causes of Death: Chronic Disease

## EXHIBIT 2

**Total Deaths And Age-Adjusted Death Rates (Per 100,000 Population) For The Fifteen Leading Causes Of Death In The Total U.S. Population, 2003**



**Acute causes of death are the exception, not the rule**

**SOURCE:** D.L. Hoyert et al., "Deaths: Final Data for 2003," *National Vital Statistics Report* 54, no. 13 (2006): 1-120.

**NOTE:** Numbers in parentheses are age-adjusted death rates per 100,000 population.

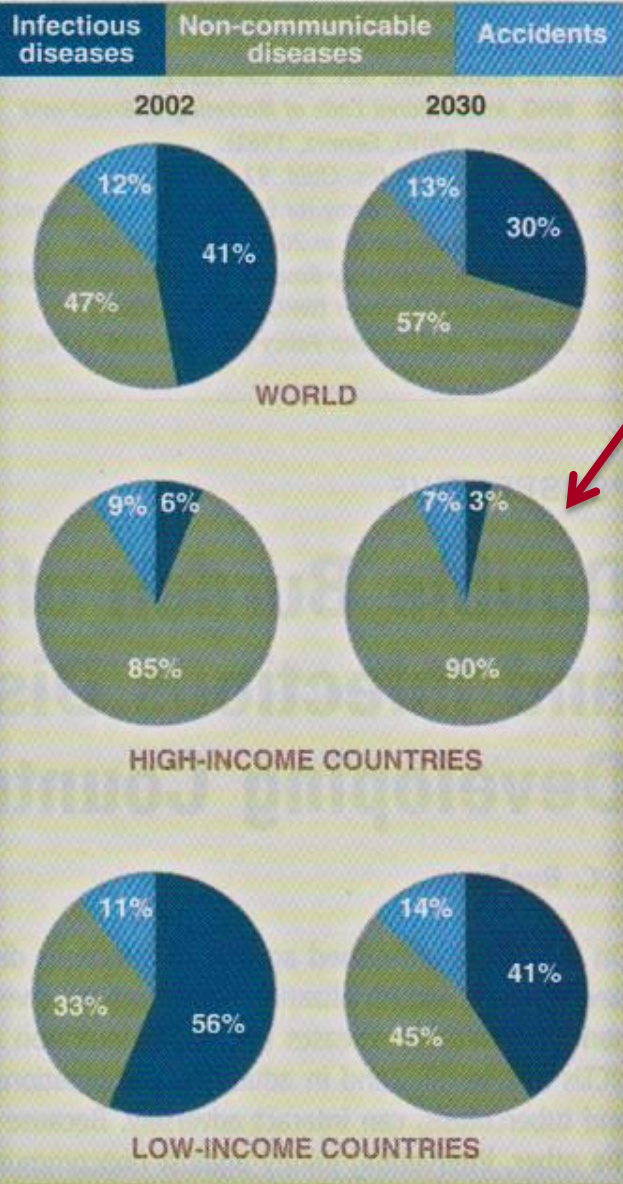
# Distal Causes of Death: Unhealthy Lifestyles

**Table 2.** Actual Causes of Death in the United States in 1990 and 2000

| Actual Cause                             | No. (%) in 1990*      | No. (%) in 2000         |
|--|-----------------------|-------------------------|
| <u>Tobacco</u>                           | 400 000 (19)          | 435 000 (18.1)          |
| <u>Poor diet and physical inactivity</u> | 300 000 (14)          | 400 000 (16.6)          |
| <u>Alcohol consumption</u>               | 100 000 (5)           | 85 000 (3.5)            |
| Microbial agents                         | 90 000 (4)            | 75 000 (3.1)            |
| Toxic agents                             | 60 000 (3)            | 55 000 (2.3)            |
| Motor vehicle                            | 25 000 (1)            | 43 000 (1.8)            |
| Firearms                                 | 35 000 (2)            | 29 000 (1.2)            |
| <u>Sexual behavior</u>                   | 30 000 (1)            | 20 000 (0.8)            |
| <u>Illicit drug use</u>                  | 20 000 (<1)           | 17 000 (0.7)            |
| <b>Total</b>                             | <b>1 060 000 (50)</b> | <b>1 159 000 (48.2)</b> |

\*Data are from McGinnis and Foege.<sup>1</sup> The percentages are for all deaths.

If these unhealthy lifestyles are manifestations of behavioral allostasis, a **FUNDAMENTAL** cause of death is **TOXIC STRESS!**



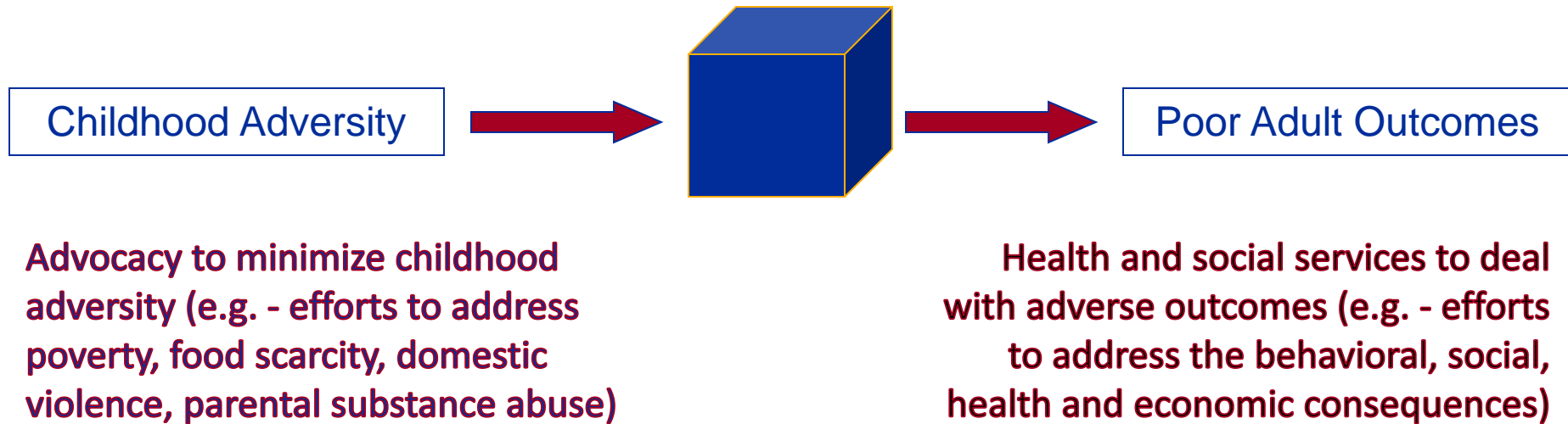
- By 2030, **90%** of the morbidity in high income countries will be due to **Non-Communicable Diseases**
- Most NCDs are due to **unhealthy behaviors** (overeating, smoking, alcohol, promiscuity, and illicit drugs)

**Fig. 1.** The proportional distribution of disability-adjusted life years, contributable to infectious diseases and NCDs for (top) the world, (middle) high-income countries, and (bottom) low-income countries for 2002 and 2030 (3).

# SUMMARY

- ✓ Toxic stress is the **MEDIATOR** between early childhood adversity and less than optimal outcomes in learning, behavior and health
- ✓ Understanding the **BIOLOGY** underlying these well established associations opens up new opportunities for primary prevention and early intervention

# Linking Childhood Experiences and Adult Outcomes



# What We Can Do Now!

## Start Early!

- Identify kids exposed to ACEs through routine screenings and establish prevention programs in healthcare, schools and youth-serving organizations

## Focus on early childhood and early adolescence

## Invest in programs that heal

- Don't spend money on programs that don't support the health and development of our kids – punitive school discipline/juvenile justice



# What We Can Do Now!

## Change Public Policy

- Support prevention and healing using policy to prioritize funding for early detection and effective intervention

## Make ACEs a public health issue

- Educate our community about the impact and the role each of us can play.



A REPORTER AT LARGE

## THE POVERTY CLINIC

*Can a stressful childhood make you a sick adult?*

BY PAUL TOUGH



Nadine Burke at her San Francisco clinic. Photograph by Alessandra Sanguinetti.

Monisha Sullivan first visited the Bayview Child Health Center a few days before Christmas, in 2008. Sixteen years old, she was an African-American teen-age mother who had grown up in the poorest and most violent neighborhood in San Francisco, Bayview-Hunters Point, a bleak collage of warehouses and one-story public-housing projects in the city's southeastern corner. Sullivan arrived at the clinic with ailments that the staff routinely observed in patients: strep throat, asthma, scabies, and a weight problem. The clinic's medical director, Nadine Burke, examined Sullivan and prescribed the usual remedies—penicillin for her strep throat, ProAir for her asthma, and permethrin for her scabies—and at most clinics that

would have been the end of the visit. But Burke, who founded the center in 2007, was having a crisis of confidence regarding her practice, and Sullivan was the kind of patient who made her feel particularly uneasy. Burke was diligently ticking off each box on the inner-city pediatrician's checklist, but Sullivan's problems appeared to transcend mere physical symptoms. She was depressed and listless, staring at the floor of the examination room and responding to Burke's questions in sullen monosyllables. She hated school, didn't like her foster mother, and seemed not to care one way or the other about her two-month-old daughter, Sana.

Burke is charismatic and friendly, and her palpable concern for her pa-

tients disarms even the toughest cases. It helps that she is dark-skinned, like most of her patients, and young—just thirty-five. But her childhood was very different from theirs. The daughter of Jamaican professionals who moved from Kingston to Silicon Valley when Burke was four, she attended public school in Palo Alto, where the kids were mostly white and well-off, and where girls cried in the cafeteria if they didn't get the right car for their sixteenth birthday. Like many children of immigrants, Burke has learned to move fluidly between cultures. She now lives in a house in an upscale part of Potrero Hill, a San Francisco neighborhood, with a closet full of designer clothes, and she has a fiancé who is a wealthy solar-energy entrepreneur. But she seems just as comfortable among the mostly poor families she sees in her examination room: laughing, gossiping, hugging, and scolding, in Spanish as well as in English, in a full-throated alto that echoes down the hall.

At the clinic, Burke gently interrogated Sullivan until she opened up about her childhood: her mother was a cocaine addict who had abandoned her in the hospital only a few days after she was born, prematurely, weighing just three and a half pounds. As a child, Sullivan lived with her father and her older brother in a section of Hunters Point that is notorious for its gang violence; her father, too, began taking drugs, and at the age of ten she and her brother were removed from their home, separated, and placed in foster care. Since then, she had been in nine placements, staying with a family or in a group home until, inevitably, fights erupted over food or homework or TV and Sullivan ran away—or her caregivers gave up. She longed to be with her father, despite his shortcomings, but there was always some reason that he couldn't take her back. For a long time, she had the same dream at night: taking the No. 44 bus back to Hunters Point, walking into her father's house, and returning to her old bedroom, everything just as it used to be. Then she'd wake up and realize that none of it was true.

When I met Sullivan, last September, she had recently turned eighteen, and three days earlier she had been emancipated from foster care. She was now liv-

# Science Informed Practices

- Create a comprehensive **trauma informed approach** to all we do.
- Home Visitation Initiative
- Trauma Treatment Program
- Employee Wellness and Professionalism
- Universal Intimate Partner Violence Screening
- Partnership for Family Resilience





# Partnership for Resilient Families

- Interprofessional teams knocking down silos to bring the best of health care and the best of early childhood education together to benefit children
- Leadership and rank and file in ongoing working relationship.
- Parents part of the solution
- Willingness to experiment



# Together we can accomplish so much



For more information contact  
Donna O'Malley, RN, PhD  
CMH Partnership for Resilient Families  
816 559-9515 [domalley@cmh.edu](mailto:domalley@cmh.edu)





## POLICY STATEMENT

# Early Childhood Adversity, Toxic Stress, and the Role of the Pediatrician: Translating Developmental Science Into Lifelong Health

## abstract

FREE

Advances in a wide range of biological, behavioral, and social sciences are expanding our understanding of how early environmental influences (the ecology) and genetic predispositions (the biologic program) affect learning capacities, adaptive behaviors, lifelong physical and mental health, and adult productivity. A supporting technical report from the American Academy of Pediatrics (AAP) presents an integrated ecobiodevelopmental framework to assist in translating these dramatic advances in developmental science into improved health across the life span. Pediatricians are now armed with new information about the adverse effects of toxic stress on brain development, as well as a deeper understanding of the early life origins of many adult diseases. As trusted authorities in child health and development, pediatric providers must now complement the early identification of developmental concerns with a greater focus on those interventions and community investments that reduce external threats to healthy brain growth. To this end, AAP endorses a developing leadership role for the entire pediatric community—one that mobilizes the scientific expertise of both basic and clinical researchers, the family-centered care of the pediatric medical home, and the public influence of AAP and its state chapters—to catalyze fundamental change in early childhood policy and services. AAP is committed to leveraging science to inform the development of innovative strategies to reduce the precipitants of toxic stress in young children and to mitigate their negative effects on the course of development and health across the life span. *Pediatrics* 2012;129:e224–e231

## INTRODUCTION

"It is easier to build strong children than to repair broken men."  
Frederick Douglass (1817–1895)

From the time of its inception as a recognized specialty of medicine, the field of pediatrics has attached great significance to both the process of child development and the social/environmental context in which it unfolds. When the American Academy of Pediatrics (AAP) was founded in 1930, the acute health care needs of children were largely infectious in nature.<sup>1</sup> Over the ensuing 80 years, as increasingly effective vaccines, hygiene, and other public health initiatives produced dramatic gains, astute observers began to note that many noninfectious disease entities, such as developmental, behavioral, educational, and

COMMITTEE ON PSYCHOSOCIAL ASPECTS OF CHILD AND FAMILY HEALTH, COMMITTEE ON EARLY CHILDHOOD, ADOPTION, AND DEPENDENT CARE, AND SECTION ON DEVELOPMENTAL AND BEHAVIORAL PEDIATRICS

## KEY WORDS

advocacy, brain development, ecobiodevelopmental framework, family pediatrics, health promotion, human capital investments, new morbidity, toxic stress, resilience

## ABBREVIATIONS

AAP—American Academy of Pediatrics  
EBD—ecobiodevelopmental

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YOUR IMPACT  
ON KIDS  
WITH TOXIC STRESS  
WILL BE  
MEANINGFUL  
TANGIBLE, AND FOREVER.



## THE RESILIENCE PROJECT

We can stop Toxic Stress.

It's been conclusively determined by a 15 year body of research. Toxic Stress is detrimental to brain architecture, disrupting the developing brain, and damaging lifelong health. For your patients, this means, as adults, they're more likely to experience not just depression, drug abuse, and alcoholism—but diabetes, cancer, and heart, lung, and liver disease, among other major health problems. More often than not, your patients' parents are living examples of this.

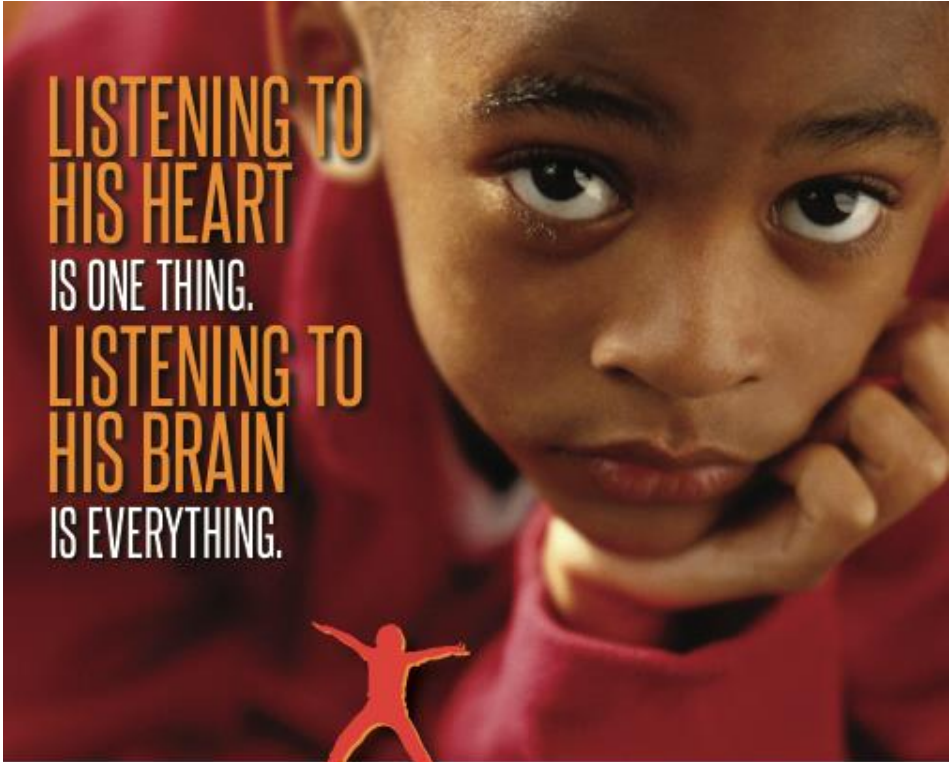
Yet, there is also significant evidence that certain treatments can reverse the neurological and psychological effects of toxic stress. But first, you

need to know what to look for. Enter Adverse Childhood Experiences (ACEs). ACEs have served as a critical measure of the lifelong impact of toxic stress. Remarkably, ACEs scores have a proven dose-response relationship with the onset of adult illness.

You have both the science and the solution to make a significant, unprecedented, lifelong impact on your patients—and their parents. The kind of impact we've all dreamed of making.

To learn what you can do to identify and reduce toxic stress, visit [aap.org/theresilienceproject](http://aap.org/theresilienceproject)

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LISTENING TO  
HIS HEART  
IS ONE THING.  
LISTENING TO  
HIS BRAIN  
IS EVERYTHING.



## THE RESILIENCE PROJECT

We can stop Toxic Stress.

It's been conclusively determined by a 15 year body of research. Toxic Stress is detrimental to brain architecture, disrupting the developing brain, and damaging lifelong health. For your patients, this means, as adults, they're more likely to experience not just depression, drug abuse, and alcoholism—but diabetes, cancer, and heart, lung, and liver disease, among other major health problems. More often than not, your patients' parents are living examples of this.

Yet, there is also significant evidence that certain treatments can reverse the neurological and psychological effects of toxic stress. But first, you

need to know what to look for. Enter Adverse Childhood Experiences (ACEs). ACEs have served as a critical measure of the lifelong impact of toxic stress. Remarkably, ACEs scores have a proven dose-response relationship with the onset of adult illness.

You have both the science and the solution to make a significant, unprecedented, lifelong impact on your patients—and their parents. The kind of impact we've all dreamed of making.

To learn what you can do to identify and reduce toxic stress, visit [aap.org/theresilienceproject](http://aap.org/theresilienceproject)

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# PEDIATRICS IS A TWO GENERATION PRACTICE.



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It is easier to build strong children than repair  
broken men.

*Frederick Douglass (1817-1895)*